What is claimed is:

1. A method of manufacturing chip inductor comprising:

a process of forming a conductive layer on an outer periphery of a substrate made of insulating material;

a coil portion forming process for forming a coil by spirally cutting said conductive layer;

an etching process for etching said coil;

an insulation resin coating process for forming an outer coating by coating at least said coil on said substrate with insulation resin; and

an electrode forming process for forming an electrode at both ends of said coil, and for making an electric contact between said electrode and said conductive layer,

wherein said insulation resin coating process includes an electrodeposition process for covering said coil with said insulation resin, using electrodeposition method to deposit said electrodeposition insulation resin at least on a surface of a conductor of said coil.

2. The method of manufacturing chip inductor according to claim 1, further comprising a heating process for heating and curing said insulation resin, after said electrodeposition process.

3. The method of manufacturing chip inductor according to claim 2, further comprising a cleaning process prior to said heating process.

4. The method of manufacturing chip inductor according to claim 2, wherein said heating process comprises a first heating process for heating said insulation resin at a temperature lower than a curing temperature of said insulation resin, and a second heating process for heating said insulation resin thereafter at a temperature higher than the curing temperature of said insulation resin.

5. The method of manufacturing chip inductor according to claim 2,

wherein said heating process comprises a heating and filling process for heating said insulation resin at a temperature lower than a curing temperature of said insulation resin for filling a groove in said coil portion with said insulation resin, and a second heating process for heating said insulation resin at a temperature higher than the curing temperature of said insulation resin for curing said insulation resin.

6. The method of manufacturing chip inductor according to claim 4, wherein said first heating process is carried out at 130 ºC, and said second heating process is carried out at 230 ºC.

7. The method of manufacturing chip inductor according to claim 5, wherein said heating and filling process is carried out at 130ºC, and said second heating process is carried out at 230ºC.

8. The method of manufacturing chip inductor according to claim 1, wherein surfaces of said conductive layer formed on both end surfaces of said substrate are not in contact with an electrodeposition bath to maintain said surfaces free of deposition of said insulation resin.

9. The method of manufacturing chip inductor according to claim 1 further including an electric-field controlling process in said electrodeposition process, wherein said electric-field controlling process ceases application of electric field before a thickness of said insulation resin covering said coil becomes greater than a thickness of said conductive layer formed on the outer periphery of said substrate.

10. The method of manufacturing chip inductor according to claim 1 wherein said electrodeposition insulation resin is epoxy-based resin.

11. The method of manufacturing chip inductor according to claim 1 further including in said electrode forming process, a process of forming said

electrode on said conductive layer formed on the outer periphery of said substrate with said insulation resin in between.

12. The method of manufacturing chip inductor according to claim 11 further including in said electrode forming process, a process of forming said electrode from an end surface of said substrate to at least a portion that faces said conductor with said insulation resin in between.

13. The method of manufacturing chip inductor according to claim 11 further including in said electrode forming process, a process of forming said electrode in a manner to locate between an end surface of said substrate and said conductor that constitutes said coil.

14. The method of manufacturing chip inductor according to claim 11 further including in said conductive layer forming process, a process of forming a conductive layer also on both end surfaces of said substrate, and a process of forming an electrode on said conductive layer formed on the end surface of said substrate.

15. The method of manufacturing chip inductor according to claim 11 including in said conductive layer forming process, a process of leaving portions free of conductive layer by not forming said conductive layer on both end surfaces of said substrate, and a process of leaving portions free of electrode by not forming said electrode on said end surfaces of said substrate.

16. The method of manufacturing chip inductor according to claim 11 further including in said electrode forming process, a process of forming said electrode in a manner that a thickness of said electrode formed on the outer periphery of said substrate is smaller than a thickness of said insulation resin formed on the outer periphery of said substrate.

17. The method of manufacturing chip inductor according to claim 11

further including in said electrode forming process a process of forming said electrode by coating conductive resin and curing said conductive resin.

18. The method of manufacturing chip inductor according to claim 11 further including in said electrode forming process a process of forming said electrode by coating conductive resin, flattening a coated surface by pressing it against a flattening plate after said conductive resin is coated, and curing said conductive resin thereafter.

19. The method of manufacturing chip inductor according to claim 11, wherein said electrode is formed in said electrode forming process in such a configuration that a length of said electrode located on the outer periphery of said substrate is larger than 1/6, but smaller than 1/2 of a dimension of said substrate, both said length and said dimension being taken along an axial direction of said coil.

20. The method of manufacturing chip inductor according to claim 1, wherein said conductive layer is formed on both end surfaces of said substrate, and said method further includes in said electrode forming process a process of cutting a surface of said conductive layer formed on the both end surfaces of said substrate.

21. The method of manufacturing chip inductor according to claim 20, wherein in said electrode forming process, a cutting depth to cut the surface of said conductive layer formed on the both end surfaces of said substrate is set to an extent not to expose the both end surfaces of said substrate.

22. The method of manufacturing chip inductor according to claim 20, wherein in said electrode forming process, the surface of said conductive layer formed on the both end surfaces of said substrate is cut with a laser irradiation.

23. The method of manufacturing chip inductor according to claim 22,

wherein said laser irradiation is performed by scanning the surface of said conductive layer for a plurality of times.

24. The method of manufacturing chip inductor according to claim 20, wherein in said electrode forming process, the surface of said conductive layer formed on the both end surfaces of said substrate and the surface of said conductive layer formed on an end portion of said outer periphery of said substrate are cut with laser irradiation.

25. The method of manufacturing chip inductor according to claim 24, wherein said laser irradiation is performed by scanning the surface of said conductive layer for a plurality of times.

26. The method of manufacturing chip inductor according to claim 1 wherein said etching process includes a process of electrolytic etching with application of electric field between said conductive layer on the surface of said substrate and the electrolytic solution.

27. The method of manufacturing chip inductor according to claim 26 further comprising a process of forming an oxide film on the conductor of said coil on said substrate, after said etching process.

28. The method of manufacturing chip inductor according to claim 26, wherein electrolytic etching is carried out in said etching process while said conductive layer is kept in contact with an electrode plate for application of electric field.

29. The method of manufacturing chip inductor according to claim 26, wherein electrolytic etching is carried out in said etching process, in a manner that said substrate having said conductive layer formed thereon is placed in an electrically conductive vessel, electric field is applied between said conductive layer and electrolytic solution through said vessel while said substrate is kept in

contact with said vessel.

30. The method of manufacturing chip inductor according to claim 26, wherein electrolytic etching is carried out in said etching process so that a thickness of said conductive layer becomes larger than a width of the conductor of said coil.

31. The method of manufacturing chip inductor according to claim 1, wherein said etching process is a chemical etching process.

32. The method of manufacturing chip inductor according to claim 1, wherein said etching process is a chemical etching process with ultrasonic vibration.